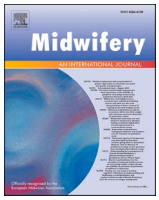
Midwifery 163 (2026) 104991



Contents lists available at ScienceDirect

Midwifery

journal homepage: www.elsevier.com/locate/midw





Association between preferred and documented mode of birth and birth experiences in low- and middle-income countries: a multisite cross-sectional study

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ARTICLE INFO

Keywords:
Mode of birth preferences
Vaginal birth
Caesarean section
Childbirth experience
LMICs

ABSTRACT

Rationale and objectives: Unmet birth expectations can affect birth experiences and satisfaction with care (BES). In low- and middle-income countries (LMICs), rising caesarean section (CS) rates may widen mode of birth (MOB) preferences and clinical decisions gaps. We describe matches between MOB preferences and the MOB documented in medical records, and assess whether such matches were associated with BES.

Methods: We pooled data from two cross-sectional surveys in 32 hospitals in Argentina, Burkina Faso, Thailand, and Viet Nam (QUALI-DEC project). Postpartum women retrospectively reported the MOB they had preferred during late pregnancy. We assessed separately whether women's preferred MOB matched the initiated and actual MOB documented in medical records. We measured BES using the QUALI-DEC Birth Experience and Satisfaction scale, and computed overall and dimension-specific BES scores. Associations between preferred–documented MOB matches and BES scores were estimated using multilevel multivariable linear regression, adjusted for confounders, clustering, and selection bias.

Findings: Of 3228 women with a MOB preference, preferred–documented MOB match rates were high for both initiated (92.0%) and actual (78.0%) MOB. Women preferring vaginal birth (VB) more often had an initiated (98.0%) and actual (81.0%) VB; those preferring CS less often had a matching prelabour CS (33.0%) or actual CS (57.0%). Matches were modestly associated with higher overall and dimension-specific BES scores, regardless of preference for VB or CS.

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https://doi.org/10.1016/j.midw.2026.104991
Received 9 April 2026; Received in revised form 10 September 2026; Accepted 14 September 2026
Available online 18 September 2026
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Conclusions: Findings suggest matches between women's preferences and documented MOB may be relevant to understanding variation in BES. Additional research is needed to further clarify these associations in LMICs.

Introduction

Women's birth experiences and satisfaction with care (BES) are key quality of care outcomes (Tunçalp et al., 2015). The World Health Organization (WHO) defines a positive birth experience as one that fulfils or exceeds a woman's prior personal and sociocultural beliefs and expectations (World Health Organization, 2018). These expectations include giving birth to a healthy baby, with clinically competent clinical staff and in a psychologically safe environment. Furthermore, women expect to have choices regarding their birth (Davies et al., 2024). Evidence from high-income countries shows that women whose mode of birth (MOB) matches their preferred MOB are more likely to report high satisfaction with care during labour, childbirth and the immediate postpartum period (Webb et al., 2021; Fobelets et al., 2019), as well as better maternal outcomes (Ferrer et al., 2016). Conversely, there is consistent evidence that mismatches between women's preferred MOB and the MOB they experienced are associated with lower satisfaction (Webb et al., 2021), reduced postnatal care attendance, decreased desire for future pregnancies (Larsson et al., 2022), and a lower likelihood of choosing the same place of birth in subsequent pregnancies (Ferrer et al., 2016). Current evidence shows that women whose birth expectations - including those related to MOB - are unmet face a heightened risk of psychological distress. This can lead to lasting consequences, such as a fear of childbirth and the development of post-traumatic stress disorder (Webb et al., 2021; Sluijs et al., 2020). A recent qualitative study found that women, irrespective of parity, described childbirth as successful when their preferred MOB was fulfilled (Gustafsson and Raudasoja, 2025). Therefore, whether women's preferred MOB matches the MOB documented in medical records may be relevant to their BES.

In low- and middle-income countries (LMICs), most women in LMICs prefer a vaginal birth (VB) (Coates et al., 2020; Etcheverry et al., 2024) and fewer than 20% prefer a caesarean section (CS) (Etcheverry et al., 2024). However, CS rates have been steadily rising in LMICs (Betran et al., 2021; Albarqouni et al., 2023), raising questions about whether women's preferred MOB matches the MOB documented in medical records (Betran et al., 2021). And limited evidence is available on the prevalence of such matches and whether they are associated with BES.

In response, the QUALIty DECision-making (QUALI-DEC) project started in January 2020 and aimed to promote the appropriate use of CS and a positive birth experience by improving decision-making in four LMICs with high rates of CS: Argentina, Burkina Faso, Thailand, and Viet Nam (Dumont et al., 2020). In Argentina, 30% to 40% of women who preferred VB gave birth by CS (Mazzoni et al., 2016; Perrotta et al., 2022). In Burkina Faso, CS rates reached 26%, with low-risk women driving high CS rates (Ouattara et al., 2021). In Thailand, most women prefer VB, although there is demand for CS (Yamasmit and Chaithongwongwatthana, 2012). In Vietnam, high CS rates (2014 national, 28%; 2021 urban, 50%) (Betran et al., 2021; Giang et al., 2022) are driven primarily by health worker decision-making (Takegata et al., 2020).

The QUALI-DEC project comprised a multi-faceted, non-clinical intervention targeting pregnant women and healthcare providers (HCPs) simultaneously. The intervention combined four components: (i) opinion leaders to improve adherence to evidence-based clinical practices among clinicians; (ii) audits and feedback of CS in low-risk women to help HCPs identify unnecessary or potentially avoidable CS; (iii) implementation of the companionship of choice during labour and childbirth to support women; (iv) a Decision-Analysis Tool to assist women in making informed decisions on MOB (Dumont et al., 2020). Then, an intervention effectiveness evaluation was conducted at the end of the project (2024).

This study is embedded within the QUALI-DEC project. We describe whether women's MOB preferences matched the MOB documented in medical records and assess whether such matches were associated with BES in Argentina, Burkina Faso, Thailand, and Viet Nam

Methods

This study is reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement (von Elm et al., 2008).

Study design and settings

Thirty-two hospitals – eight per country – were selected based on local recognition of the increase in CS rates and engagement in changing this trend (characteristics in Supplementary Table S1). Two postpartum cross-sectional surveys were conducted before and after the intervention period, as part of the QUALI-DEC effectiveness evaluation, to measure secondary outcomes (Dumont et al., 2020). The first cross-sectional survey was conducted baseline, before any intervention was implemented in the participating hospitals; the second cross-sectional survey was conducted endline, after the intervention was implemented. The QUALI DEC surveys with postpartum women were conducted in Argentina (baseline: 15 December 2021–24 June 2022; endline: 24 June 2024–16 September 2024), Burkina Faso (baseline: 8–26 December 2020; endline: 16–31 October 2023), Thailand (baseline: 6 March 2021–3 January 2022; endline: 18 March 2024–14 July 2024), and Viet Nam (baseline: 8–21 October 2021; endline: 22 April 2024–14 May 2024). The baseline and endline surveys comprised independent cross-sectional samples, with distinct participants in each phase.

Participants and sample size

Postpartum women who had a liveborn infant after 22 weeks gestation (28 weeks in Burkina Faso) in each study hospital were eligible to participate in the survey, prior to hospital discharge. Women with conditions associated with a potential risk of CS, including non-cephalic presentation, multiple pregnancy, history of CS, hypertensive disorders with or without associated complications, suspected foetal growth impairment, diabetes (type I, type II, or gestational), cardiac or renal disease, chronic respiratory conditions, and confirmed HIV/AIDS were excluded. Exclusion criteria further comprised serious postpartum health problems, stillbirth, neonatal death, or congenital malformations. In addition, women with abortion or miscarriage, and women who gave birth at home or in another facility (i.e., postnatal transfers), were excluded (Dumont et al., 2020).

The required sample size was calculated to detect the expected difference in BES scores between the pre-intervention and post-intervention periods. Hence, a sample of 470 women per country at baseline and 470 women at the end of the intervention period was estimated to ensure 90% statistical power and detect an effect size of 0.3 standard deviation or greater in satisfaction scores, with a two-sided 5% significance level. The calculation accounted for the clustered nature of the data by hospitals with a design effect of 2. Allowing for 10% non-response and 10% ineligibility, the target sample size was increased to 564 women per country in each phase (Dumont et al., 2020).

Recruitment and data collection procedures

The QUALI-DEC trial protocol has been published previously, and full methodological details are available in that report (Dumont et al., 2020). A representative sample of women was recruited at each participating hospital over a period ranging from 14 to 46 days, depending on the facility's volume of births. Eligible women were approached daily by a social scientist during their stay in the postnatal ward, ensuring consecutive sampling at each of the two cross-sectional survey rounds. If they agreed to participate, the consent form was completed, and women were surveyed face-to-face by the social scientist using a tablet-based data collection form. This questionnaire collected data on women's sociodemographic characteristics, pregnancy and childbirth, preferred MOB in early and late pregnancy, and BES. After completion of the survey, there was no further contact with the woman.

With respect to MOB preference data, early- and late-pregnancy preferences were measured retrospectively during the postpartum period, prior to hospital discharge. Comparable question structures and branching logic were used for both variables. For late-pregnancy preference, women were asked the following question: "Towards the end of your pregnancy, did you have a preferred mode of birth?" Response options were yes, no, or "Don't know". Only women who answered yes were then asked a follow-up question: "What was your preferred mode of birth towards the end of pregnancy? For instance, vaginal birth or caesarean section?" with response options limited to yes, no, or "Don't know".

Regarding BES, all data were collected using the validated 10-item QUALI-DEC birth experience and satisfaction (QD-BES) scale (Table 1) (Bohren et al., 2025). The tool was developed through a literature review and consensus discussions with the QUALI-DEC research team. The scale consists of a short, easily-administered questionnaire which demonstrated strong validity and high internal consistency reliability based on its psychometric properties according to psychometric qualities (Cronbach's alpha >0.80 for the total scale, >0.75 for each subscale, and a stable three-factor structure across the four participating countries). The individual statements, i.e. items 1 to 10 (Table 1) were derived from existing literature and prior qualitative work in maternity care, and were designed to capture relevant dimensions of the childbirth experience (Bohren et al., 2025). Women's responses were rated on a 4-point Likert scale (1: strongly disagree; 2: disagree; 3: agree; 4: strongly agree) (Bohren et al., 2025).

A data collector also extracted relevant clinical data from women's medical records for the study, including reproductive history, labour & childbirth characteristics and childbirth outcomes. Women's final MOB was also collected from medical records.

Data-collection procedures were standardised across all survey time points and across participating hospitals, with the same questionnaire items and medical-record information collected consistently before and after QUALI-DEC intervention implementation.

Outcomes

The primary outcome was the overall BES score, derived from the 10-item scale (Bohren et al., 2025). This score was treated as a continuous variable for statistical analyses, since it was computed as the ratio of the observed score to the maximum possible score on the 10-item BES scale. The maximum score is 40 for the full 10-item scale; however, this adjusts to 36 for women with pre-labour CS who were therefore unaffected by item 1, and to 32 for those unaffected by items 2 and 3 (i.e. newborns hospitalized in intensive care unit) (Supplementary Table S2). The resulting overall BES score, as a ratio, ensures comparability across women even when some items are not applicable. Higher scores indicate a more positive birth experience and greater satisfaction with care.

Secondary outcomes consist of BES scores by dimension: emotional satisfaction (3-item subscale), support and respect from providers (4-item subscale), and communication with providers (3-item subscale)

Table 1
The QUALI-DEC birth experience and satisfaction (QD-BES) questionnaire.

Item	Question	Validated QD-BES dimension
BES1	*Labour can be a painful and difficult time for women.* Do you agree with this statement: "I am satisfied with my ability to cope with pain during labour"?	Emotional satisfaction
BES2	*You may have been looking forward to holding your baby after he/she was born, and sometimes this can take some time.* Do you agree with this statement: "I am satisfied with the amount of time that passed after the birth, before I first held my baby"?	Emotional satisfaction
BES3	*You were probably looking forward to feeding your baby for the first time.* Do you agree with this statement: "I am satisfied with the amount of time that passed before I first fed my baby "?	Emotional satisfaction
BES4	Do you agree with this statement: "I am satisfied with the amount of time the health workers spent with me during labour"?	Support & respect by providers
BES5	Do you agree with this statement: "I am satisfied with the attitude of health workers during labour and birth"?	Support & respect by providers
BES6	Do you agree with this statement: "During my stay at the hospital for childbirth, health workers informed me about decisions that they took regarding my care"?	Communication with providers
BES7	*You probably had some concerns or fears during your stay in the hospital for childbirth.* Do you agree with this statement: "During my stay at the hospital for childbirth, I feel that I had the opportunity to discuss any fears or concerns I had with a health worker"?	Communication with providers
BES8	*You may have had some preferences about how you wanted to give birth.* Do you agree with this statement: "I had the opportunity to discuss my preferences or requests with a health worker during your stay in the hospital for birth"?	Communication with providers
BES9	*Sometimes the labour room can get busy.* Do you agree with this statement: "I feel that my privacy was respected during examinations and treatments"?	Support & respect by providers
BES10	Based your experience during labour and childbirth, would you agree or disagree with this statement: "Overall, I felt well supported during labour and childbirth".	Support & respect by providers

(Table 1) (Bohren et al., 2025). The ratio for each dimension was computed similarly as for the overall score, with the maximum score varying based on the number of applicable items for the individual woman (Supplementary Table S2).

This approach placed scores on a common 0–1 scale despite variation in the number of applicable items and facilitated comparison across women and study contexts (Curran et al., 2021).

Exposure

We operationalised the exposure in two ways: i) the match between the preferred MOB during late pregnancy (reported postpartum) and the *initiated* MOB documented in medical records, and ii) the match between the preferred MOB during late pregnancy (reported postpartum) and the *actual* MOB documented in medical records.

First, the information on the final MOB was collected from medical records to construct the derived variables "Trial of labour" (Yes/No) and "initiated MOB" (VB/Pre-labour CS) (Supplementary Table S3). Trial of labour was defined as having a spontaneous VB, an instrumental VB (forceps or vacuum), or an intrapartum CS. Women who underwent a CS before the onset of labour were classified as not having a trial of labour. Initiated MOB was defined according to the MOB documented in the

medical record as either a trial of labour or a pre-labour CS. This classification reflects the documented MOB initiated on or before the onset of labour. Under this definition, a woman's preference for VB was considered a match with the initiated MOB if she had a trial of labour, regardless of whether she ultimately gave birth vaginally or by CS (Supplementary Tables S3 and S4). Similarly, a woman's preference for CS was considered a match with the initiated MOB if she had a pre-labour CS.

The *actual* MOB was defined as the final MOB, based on the mode of birth documented in medical records. It could differ from the initiated MOB when events occurring during labour or birth resulted in a change in the MOB. Under this definition, a woman's preference for VB was considered a match with the *actual* MOB only if she ultimately gave birth vaginally. For a woman preferring CS, a match with the *actual* MOB was defined as birth by CS, whether the CS occurred before labour or intrapartum (Supplementary Tables S3 and S4). Thus, for *actual* MOB, only the final documented MOB was considered, consistent with approaches used in the literature (Fobelets et al., 2019; Sluijs et al., 2020).

Accordingly, a match was defined as correspondence between a woman's preferred MOB and either her initiated or actual MOB, as presented in Table 2 and Supplementary Table S3.

Potential confounding factors

Potential confounders of the association between MOB matching and BES were selected a priori using a theory-driven approach informed by a directed acyclic graph (DAG) and prior literature, consistent with recommended methods for causal inference. Prior evidence has demonstrated that these factors are associated with both the likelihood of a match between women's preferred MOB and the initiated or actual MOB (exposure) and women's BES scores (outcome). In this study, potential confounders were grouped into three sets (Supplementary Table S5): maternal and pregnancy characteristics; labour and childbirth characteristics; hospital and organizational characteristics. Country and survey phase were also considered as potential confounding factors, as contextual differences in health systems and temporal variations in care delivery may independently influence both preferred–initiated or actual MOB matching and women's BES scores.

Analysis

Analyses used data from both cross-sectional surveys (baseline and endline), which were pooled into a single dataset to estimate overall associations. Pooling the independent samples increased the precision of estimates, while survey phase was included as a covariate in all models to account for differences between baseline and endline. Because these clinical conditions may strongly determine the MOB independently of women's preferences, we restricted the analysis to women without clinical conditions that could indicate CS. We therefore excluded women with non-cephalic presentation, multiple pregnancy, previous CS, or at least one of the following pregnancy complication or pre-existing condition such as chronic or pregnancy induced hypertension and its complications, suspected foetal growth restriction, diabetes (type I/type II/gestational), cardiac or renal diseases, chronic respiratory conditions, and confirmed HIV/AIDS.

Data were analysed using STATA statistical software, version 19.5.

Table 2
Classification of preferred–initiated and preferred–actual MOB matches.

	Initiated MOB		Actual MOB	
Preferred MOB	Trial of labour	Pre-labour caesarean section	Vaginal birth (spontaneous or instrumental[1])	Caesarean section (Pre-labour or intrapartum)
Vaginal Birth	Match	Mismatch	Match	Mismatch
Caesarean Section	Mismatch	Match	Mismatch	Match

[1] Forceps/vacuum.

QD-BES responses scoring

Women's responses were scored as follows: 1 strongly disagree, 2 disagree, 3 agree, 4 strongly agree. "Don't know" responses were *a posteriori* coded as 2.5, following common psychometric practice, whereby it reflects the assumption that a midpoint scoring indicates a neutral or indifferent attitude (Krosnick et al., 2002). This approach preserves the respondent's contribution while avoiding artificial inflation or deflation of scores that may not align with the respondent's intention (Krosnick et al., 2002 Sep 1; DeCastellarnau, 2018), thus reducing missing-data bias and avoiding directional misclassification bias. Moreover, assigning "Don't know" a midpoint value allows the assessment of direction and the neutrality of answers (VanderWeele, 2019).

Sample characteristics, bivariate analyses and unadjusted analysis

We compared the characteristics of the sampled women across countries using Pearson's chi-square test for categorical variables and the Kruskal–Wallis test for continuous variables. We then compared the characteristics of women across exposure groups using the same statistical tests. For comparisons of BES scores between women with and without matches between their preferred MOB and the initiated or actual MOB, we used the Wilcoxon rank-sum test.

Multivariable analyses

In multivariable analyses, we estimated the associations between BES scores and preferred–initiated MOB matching and preferred–actual MOB matching using distinct Heckman selection models. This method consists of a two-equation system: a selection equation and an outcome equation (Heckman, 1977). The selection equation models the probability that a woman reported a late-pregnancy MOB preference, thereby determining whether her MOB preference could be observed and whether she could be included in the matching analysis. The outcome equation estimates the association between MOB matching and BES among women with an observed late-pregnancy MOB preference. This approach accounts for the possibility that women who reported a MOB preference differed systematically from those who did not, resulting in non-random selection into the analytic sample (Heckman, 1977; Sales et al., 2004). Thus, the Heckman method was used to correct for selection bias due to observing MOB preferences only among women who reported they had a late-pregnancy MOB preference.

The selection equation was specified a priori based on factors considered likely to influence whether women reported a late-pregnancy MOB preference. These factors included characteristics reflecting women's exposure to information, opportunities to form a preference, and contextual conditions that may shape preference articulation. They were informed by established predictors of MOB preferences (Coates et al., 2020; Etcheverry et al., 2024; Colomar et al., 2021; Cruickshank et al., 2025; Li et al., 2025; Osouli-Tabrizi et al., 2026). Rural residence and hospital distance from the woman's home were specified as exclusion restrictions and included in the selection equation but not in the outcome equation. These variables were considered relevant to the probability of reporting a late-pregnancy MOB preference. Preliminary bivariate analyses found no evidence of an association between either variable and overall BES (Supplementary Tables S14a and S14c), providing additional empirical support for their exclusion from the outcome equation. Their validity as exclusion restrictions nevertheless relies on the assumption that they have no direct association with BES conditional on the covariates included in the outcome equation. The selection model was specified as a backward stepwise probit model. Candidate variables with a p-value $\leq$0.20 in bivariate analyses were considered for inclusion in the selection equation. The

final selection and outcome equations were jointly estimated by maximum likelihood using the Heckman model to account for non-random selection into the analytic sample (StataCorp, 2023).

The outcome equation utilized multilevel multiple linear regression (MMLR) to estimate associations with the overall BES score, incorporating random intercepts to adjust for the clustering of women within hospitals. The model was adjusted for country, survey round (pre- and post-intervention), and potential confounders selected according to a three-stage adjustment strategy: Stage 1 adjusted for maternal and pregnancy characteristics, Stage 2 for labour and childbirth factors, Stage 3 for hospital and organizational characteristics. In the final model of the outcome equation, covariates from each previous model with $p \leq 0.20$ were retained and tested. We aimed to ensure that covariates from the third set were analysed, eliminating the risk of their systematic omission following model stabilization with the first two sets, particularly if sets of confounders were added stepwise. The initiated MOB and actual MOB were not included as covariates in the adjusted outcome models because they are intrinsic components of the respective exposure variables (preferred–initiated MOB matching and preferred–actual MOB matching). Including them in the models would potentially have introduced collinearity with the exposure and compromised the interpretability of the estimated associations.

Model convergence was assessed for all beta regression models. In instances where the full-information maximum likelihood Heckman model encountered convergence difficulties, we employed a bootstrap-based two-step control-function approach. This method involved estimating the selection equation separately, deriving the correction term, and incorporating it into the outcome model while retaining facility-level clustering. The use of bootstrap resampling provided more stable standard errors and yielded more precise confidence intervals, thereby improving the robustness of the selection-corrected estimates.

Match with initiated vs actual MOB

We ran separate models for preferred–initiated MOB matches and preferred–actual MOB matches. The difference in mean BES scores between women with a match and a mismatch was estimated by the β coefficient with 95% confidence intervals (CIs) from each model. The model-based two-sided Wald test, at $\alpha = 0.05$, was used to test the significance of the mean difference.

Effect modification

Interactions were tested at one-tailed α=0.05 to assess whether the association between BES score and MOB preference matches varied by preferred MOB (VB versus CS).

Secondary analyses

The associations between MOB preference matches and each dimension of the BES score, related to either emotional satisfaction, or support and respect by providers, or communication with providers, were analysed using the same methods as for the primary analyses for the overall score.

Missing data

With 2.6% missing data on BES responses to the 10 items (Supplementary Tables S6 and S7), we performed a complete case analysis without imputing missing data. Regarding the covariates, there were an additional $N = 178/3692$ (4.8%) observations with at least one missing data on any covariate included in the final models. Thus, we ran models after mode imputation on covariates (Supplementary Tables S7). The distribution of missingness for covariates is presented in Supplementary Tables S8.

Sensitivity analyses

In a first exploratory sensitivity analysis, we excluded women who preferred a CS in late pregnancy because they were substantially fewer than women who preferred VB. In addition, CS on maternal request was not an established practice in the four participating countries. We hypothesised that, in this context, matches among women preferring CS might not be associated with BES scores because their preference could not routinely be acted upon as maternal-request CS.

Then, to assess the robustness of our findings when assigning "Don't know" answers on BES items a midpoint score, we also conducted a sensitivity analysis using an alternative coding strategy. Specifically, we re-estimated all models by treating "don't know" responses as missing values (i.e., excluded from the item-level denominator when calculating the ratio score).

Finally, we performed a full complete-case analysis or listwise deletion whereby only individuals with complete data on all variables included in the model – i.e. exposure, outcome, and covariates – were retained.

Ethical approval

Ethical clearance for the QUALI-DEC study was obtained from the local and institutional review boards from the Centro Rosarino de Estudios Perinatales of Rosario, Argentina (Record Notice No. 1/20), Pham Ngoc Thach University of Ho Chi Minh City in Viet Nam, Khon Kaen University in Thailand, the Ethics Committee for Health Research of Burkina Faso (Decision No.2020-3-038), the Research Project Review Panel (RP2) in the UNDP/UNFPA/UNICEF/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction (WHO study No. A66006), and the French Research Institute for Sustainable Development (IRD). This study is on the Current Controlled Trials website (https://www.isrctn.com/) under the number ISRCTN67214403.

Results

Among the 6198 women included in the survey, 2347 women with a potential risk of CS were excluded from this analysis. Additional 59 women were excluded because of missing data on final MOB ($n = 2$) or on MOB preference ($n = 57$), and 100 women were excluded due to having at least one missing data on a BES item (Figure S1). The distribution and management of missing data for the key variables are detailed in Supplementary Table S7. We then analysed preferred–initiated MOB matches and preferred–actual MOB matches separately among 3692 women without potential risk for CS (Fig. S1; Supplementary Table S7).

The characteristics of the 3692 women are presented in Table 3. Most women were <30 years old (65.2%), nulliparous (75.2%), had at most secondary education (73.4%) and attended at least 4 antenatal care (ANC) visits (89.4%). Most women in each country had lower wealth index (45.5%). Late-pregnancy preference for VB was common (80.3%); most women preferring CS were found in Thailand (15.9%). Overall, 54.9% of the women reported discussing their MOB preference with a healthcare provider; 83.6% identified <3 MOB-related advantages, i.e. evidence-based clinical risks of MOBs for the health of mothers and children, which reflect consistency with biomedical knowledge (Supplementary Table S9). Most women had a VB (77.7%), predominantly spontaneous, while 22.3% gave birth by CS. Among women with VB, labour onset was spontaneous in 85.5% and 86.5% received no anaesthesia/analgesia in the first stage of labour. Mean gestational age at childbirth was 38.4 weeks (SD 1.8). Births were attended by a physician in 55.2% of cases, 94.5% had short hospital stays. Neonatal outcomes were favourable: Apgar ≥7 was recorded in 99.0% and birthweight >2500 g in 86.9%. Two-thirds gave births in teaching hospitals (Table 3).

Women's preference for mode of birth

Among 3692 women, 3228 (87.4%) expressed a late-pregnancy MOB preference (Figure S1, Table S7), varying from 757 (73.6%) in Burkina

Table 3
Women's characteristics by country.
N = 3,692 women. Data are number of women with column percentage n (%).

Characteristics	All women (N= 3,692)	Argentina N = 669	Burkina Faso N= 1,028	Thailand N=927	Viet Nam N= 1,068	p-value[1]
Survey phase						
Pre-intervention	1,893 (51.3)	341 (51.00)	434 (42.2)	532 (57.4)	586 (54.9)	<0.001
Post-intervention	1,799 (48.7)	328 (49.0)	594 (57.8)	395 (42.6)	482 (45.1)	
Maternal sociodemographic and pregnancy characteristics						
Urban geographic context	2,711 (73.4)	664 (99.3)	719 (69.9)	756 (81.6)	572 (53.6)	<0.001
Married or living with partner	3,458 (93.7)	546 (81.6)	991 (96.4)	894 (96.4)	1,027 (96.2)	<0.001
Age < 30 years	2,408 (65.2)	447 (66.8)	727 (70.7)	581 (62.7)	653 (61.1)	<0.001
Nulliparous	2,776 (75.2)	495 (74.0)	668 (65.0)	792 (85.4)	821 (76.9)	<0.001
Woman's occupation						
Unemployed or housewife	1,444 (39.1)	399 (59.6)	514 (50.0)	282 (30.4)	249 (23.3)	<0.001
Formal sector	879 (23.8)	57 (8.5)	72 (7.0)	359 (38.7)	391 (36.6)	
Informal sector	1,369 (37.1)	213 (31.8)	442 (43.0)	286 (30.9)	428 (40.1)	
Lower education level[2]	2,708 (73.4)	553 (82.7)	948 (92.2)	500 (53.9)	707 (66.2)	<0.001
Lower wealth index[3]	1,681 (45.5)	340 (50.8)	434 (42.2)	418 (45.1)	489 (45.8)	0.007
Identified less than 3 risks related to MOB	3,086 (83.6)	614 (91.8)	829 (80.6)	787 (84.9)	865 (80.2)	<0.001
Attended < 4 of ANC visits[4]	393 (10.6)	64 (9.6)	253 (24.6)	44 (4.8)	32 (3.0)	<0.001
ANC in a private facility	1,390 (37.7)	49 (7.3)	161 (15.7)	352 (38.00)	828 (77.5)	<0.001
Preference during early pregnancy						<0.001
No preference	510 (13.8)	125 (18.7)	264 (25.7)	31 (3.3)	90 (8.4)	
Vaginal birth	3,034 (82.2)	500 (74.7)	760 (73.9)	813 (87.7)	961 (90.0)	
Caesarean section	148 (4.0)	44 (6.6)	4 (0.4)	83 (9.0)	17 (1.6)	
Preference during late pregnancy						<0.001
No preference	464 (12.6)	93 (13.9)	271 (26.4)	30 (3.2)	70 (6.6)	
Vaginal birth	2,963 (80.3)	505 (75.5)	744 (72.4)	749 (80.8)	965 (90.4)	
Caesarean section	265 (7.1)	71 (10.6)	13 (1.4)	148 (16.0)	33 (3.0)	
Talked about MOB preference to a healthcare provider	2,028 (54.9)	484 (72.4)	227 (22.1)	722 (77.9)	595 (55.7)	<0.001
Was referred from another hospital Final MOB	764 (20.7)	14 (2.1)	679 (66.0)	67 (7.2)	4 (0.4)	<0.001
VB (spontaneous)	2,816 (76.3)	519 (77.6)	809 (78.7)	640 (69.0)	848 (79.4)	<0.001
VB (instrumental)[5]	51 (1.4)	8 (1.2)	16 (1.6)	23 (2.5)	4 (0.4)	
CS (prelabour, intrapartum)	825 (22.3)	142 (21.2)	203 (19.8)	264 (28.5)	216 (20.2)	
Labour and childbirth characteristics						
Labour onset						<0.001
No labour	208 (5.6)	31 (4.6)	23 (2.2)	103 (11.1)	51 (4.8)	
Spontaneous	3,155 (85.5)	547 (81.8)	969 (94.3)	721 (77.8)	918 (86.0)	
Induced	329 (8.9%)	91 (13.6)	36 (3.5)	103 (11.1)	99 (9.2)	
Analgesia or anaesthesia during first stage of labour						<0.001
No anaesthesia or analgesia	3,195 (86.5)	597 (89.2)	1,020 (99.2)	695 (75.0)	883 (82.7)	
Anaesthesia or analgesia	497 (13.5)	72 (10.8)	8 (0.8)	232 (25.0)	185 (17.3)	
Gestational age at childbirth (weeks) Mean [SD]	38.4 [1.8]	39.1 [1.4]	37.7 [2.0]	38.3 [1.7]	38.7 [1.4]	<0.001
Qualification of birth attendant						<0.001
Nurse/Midwife/Other	1,656 (44.9)	174 (26.0)	841 (81.8)	299 (32.3)	342 (32.0)	
Physician	2,036 (55.2)	495 (74.0)	187 (18.2)	628 (67.7)	726 (68.0)	
Mother's hospital stay						<0.001
< 7 days	3,589 (94.5)	648 (96.9)	1,023 (99.5)	909 (98.1)	1,009 (94.5)	
≥ 7 days	103 (2.8)	21 (3.1)	5 (0.5)	18 (1.9)	59 (5.5)	
Newborn's Apgar score						<0.001
< 7	36 (1.0)	0 (0.0)	28 (2.7)	7 (0.8)	1 (0.1)	
≥ 7	3,656 (99.0)	669 (100.0)	1,000 (97.3)	920 (99.2)	1,067 (99.9)	
Birthweight						<0.001
> 2,500g	3,207 (86.9)	576 (86.1)	819 (79.7)	819 (88.4)	993 (93.0)	
≤ 2,500 g	485 (13.1)	93 (13.9)	209 (20.3)	108 (11.6)	75 (7.0)	
Organizational factors at the hospitals where the women gave birth						
Distance from home ≥ 30 min.	1,687 (45.7)	223 (33.3)	590 (57.4)	448 (48.3)	426 (39.9)	<0.001
Primary – secondary facility level	1,579 (42.8)	172 (25.7)	756 (73.5)	125 (13.5)	526 (49.3)	<0.001
Teaching hospital	2,564 (69.5)	669 (100.0)	426 (41.4)	927 (100.0)	542 (50.8)	<0.001
Birth volume[6], median [IQR]	4,326 [2,905 ; 5,015]	1,166 [976 ; 1,862]	3,577 [2,905 ; 5,741]	4,605 [3,361 ; 5,015]	4,503 [3,566.5 ; 10597]	<0.001
Public hospital	3,433 (93.0)	669 (100.0)	1,028 (100.0)	927 (100.0)	809 (75.8)	<0.001

[1] Pearson's chi-square, Kruskal Wallis
[2] Secondary or less
[3] Lower wealth index: 1st and 2nd quintiles, higher wealth index: 3rd, 4th and 5th quintiles
[4] ANC: antenatal care visit
[5] Forceps and/or vacuum
[6] in 2020

Faso to 897 (96.8%) in Thailand. Women's characteristics among those who expressed a preference and those who did not are presented in the Supplementary Table S9.

Based on the Heckman selection model (Supplementary Table S11), women with a late-pregnancy MOB preference were more likely to report an early-pregnancy preference, travel ≥ 30 min to the birth hospital, live in Argentina, Thailand or Vietnam, have higher education levels, reside in rural areas, and have discussed about their preferred

MOB with a HCP.

Preferred–initiated and preferred–actual MOB matches

Among the 3228 women who expressed a preference during late pregnancy, 265 (8.2%) preferred to give birth by CS and 2963 (91.8%) preferred to have VB. Substantial variation was found across countries: the prevalence of CS preference ranged from 1.7% in Burkina Faso to 16.5% in Thailand, with intermediate levels in Argentina (12.3%) and Viet Nam (3.3%).

A preferred–initiated MOB match was observed in 2993 women (92.7%), whereas a preferred–actual MOB match was observed in 2541 women (78.7%).

The match rate was higher among women who preferred VB than among those who preferred CS (98.0% versus 33.2% for preferred–initiated MOB matches; 80.7% versus 57.0% for preferred–actual MOB matches) (Fig. 1). This pattern was consistent across countries: in every setting, match rates were substantially higher among women who preferred VB than among those who preferred caesarean birth, for both initiated and actual MOB (Fig. 1). Match rates by country are detailed in Supplementary Table S12.

Among women who preferred VB ($N = 2963$), 58 had a mismatch with the initiated MOB, whereas 573 had a mismatch with the actual MOB, including the 58 women with an initiated MOB mismatch and 515 who underwent an intrapartum CS (Supplementary Table S12). Among women who preferred a VB but underwent a prelabour CS ($n = 58$), recorded indications mainly included maternal request (33.5%), cephalopelvic disproportion or suspected macrosomia (17.2%), postdate pregnancy >41 weeks (5.3%), and unclear medical indications (39.7%). Among the 515 women who preferred a VB but had an emergency CS during labour, the main indications were cephalopelvic disproportion (25.8%), dystocia (14.2%), and suspected foetal distress (37.0%).

Baseline characteristics by preferred–actual MOB match status are shown in Table 4, and those by preferred–initiated MOB match status are presented in Supplementary Table S13. Across both specifications, women were more likely to have a match if they lived in Viet Nam, resided in urban areas, were nulliparous, had lower education levels, attended at least four ANC visits, reported VB as their early-pregnancy preference, discussed their preferred MOB with a HCP, experienced spontaneous labour onset, stayed fewer than seven days postpartum in hospital, had newborns with Apgar scores ≥7, and delivered in primary or secondary-level facilities or in teaching hospitals.

Birth experience and satisfaction

The distributions of the BES scores among women who had a late-pregnancy MOB preference ($N = 3228$) are presented in Supplementary Figures S2 and S3. They show that the overall BES score was high (mean 0.86 [0.11]), varying across country from 0.80 [0.11] in Burkina Faso to 0.89 [0.11] in Thailand. Dimension-specific scores show similar distribution patterns across all three components: emotional satisfaction (mean 0.85 [0.14]); support & respect by providers (mean 0.90 [0.11]; and communication with providers (mean 0.82 [0.16]). Factors associated with overall BES score in bivariate analysis are presented in supplementary Tables S14a, S14b and S14c.

Regarding the association between match status and BES, regression models with adjustment for the three sets of covariates are presented in Supplementary Tables S14 – S16. Final models were adjusted for country, survey phase and confounding factors (marital status, occupation, education, wealth index, early-pregnancy preferred MOB, talk with a HCP about MOB preference, number of antenatal visits, birth attendant, length of mother stay in hospital postpartum, newborn's Apgar score, newborn's birthweight). Final model variables along with Stata codes are provided in Supplementary Figure S4 and Table S17 respectively. Only the support and respect by providers dimension failed to reach full convergence despite simplified specifications (reduced covariate set). As the non-converged model produced unstable estimates, we instead report the results from the bootstrap-based two-step approach.

The final models showed that having a preferred–initiated MOB match was significantly associated with higher overall BES scores (adjusted mean difference = 0.03; 95% CI [0.007; 0.06]) (Table 4, Fig. 2a, Supplementary Figure S5). Similar findings were observed for women with a preferred–actual MOB match (adjusted mean difference: 0.03; 95% CI [0.02; 0.05]) (Table 4, Fig. 2b, Supplementary Figure S6). Women with a preferred–actual MOB match also had significantly higher scores across all BES dimensions, whereas the difference in communication scores was not statistically significant under the

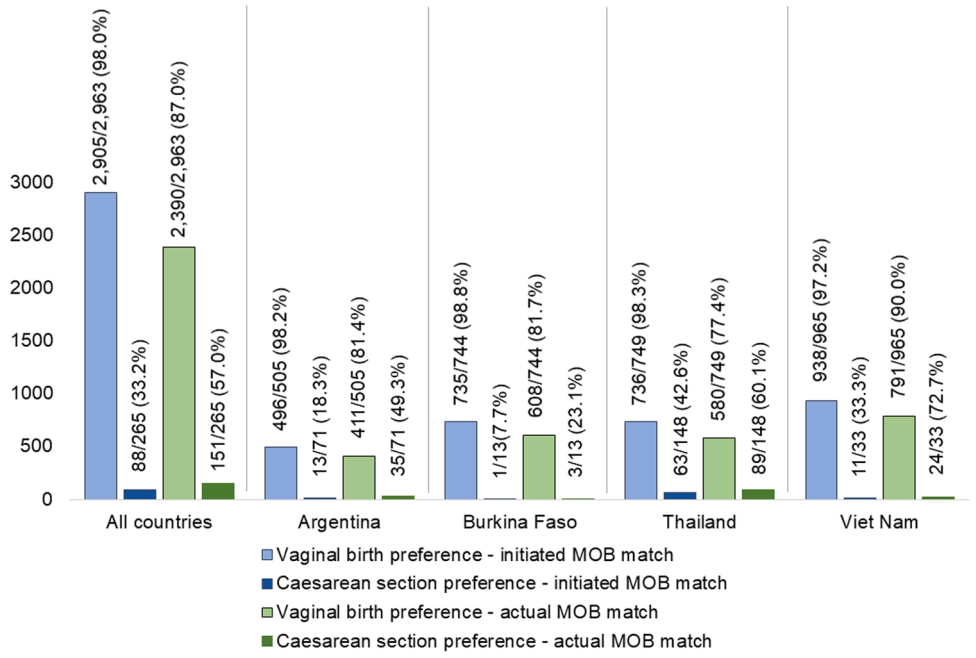


Fig. 1. Preferred–initiated and preferred–actual MOB match rates, overall and by country. $N = 3228$ women. Data are n/N (percentages).

Table 4
Baseline characteristics of women by preferred–actual MOB match status. N = **3228** women. Data are presented as number of women with column percentage n (%), mean [SD], or median [IQR]. The number of observations (non-missing and imputed) and missing values per variable (before mode imputation) are shown to allow assessment of imbalance and potential confounding between exposure groups.

Characteristics	Preferred–actual MOB match status			
	Mismatch N = **687**	**Match** N = **2541**	**Missing**[1] N (%)	**p-value**[2]
Survey phase				
Pre-intervention	358 (52.1)	1303 (51.3)	0 (0.0)	0.70
Post-intervention	329 (47.9)	1238 (48.7)		
Participating country				
Argentina	130 (18.9)	446 (17.6)	0 (0.0)	0.001
Burkina Faso	146 (21.3)	611 (24.0)		
Thailand	228 (33.2)	669 (26.3)		
Viet Nam	183 (26.6)	815 (32.1)		
Maternal sociodemographic and pregnancy characteristics				
Urban geographic context	519 (75.6)	1821 (71.6)	11 (0.3)	0.04
Married or living with partner	647 (94.2)	2382 (93.7)	3 (0.1)	0.67
Age < 30 years	451 (65.7)	1634 (64.3)	0 (0.0)	0.51
Nulliparous	574 (83.6)	1864 (73.4)	0 (0.0)	< 0.001
Woman's occupation				
Unemployed or housewife	269 (39.1)	945 (37.2)	1 (0.0)	0.005
Occupation in formal sector	199 (28.0)	624 (24.6)		
Occupation in informal sector	219 (31.9)	972 (38.2)		
Highest education level is secondary	447 (65.1)	1859 (73.2)	2 (0.0)	<0.001
Lower wealth index[3]	312 (45.4)	1163 (45.8)	1 (0.0)	0.87
Knows <3 risks related to MOB	563 (82.0)	2144 (84.4)	0 (0.0)	0.13
Attended < 4 of ANC visits[4]	46 (6.7)	258 (10.1)	61 (1.9)	0.006
ANC in a private facility	271 (39.5)	1014 (40.0)	0 (0.0)	0.83
Preference at early pregnancy	40 (5.8)	93 (3.7)	37 (1.1)	0.002
No preference	606 (88.2)	2349 (92.4)	11 (0.3)	<0.001
Vaginal birth	41 (6.0)	99 (3.9)		
Caesarean section	464 (67.5)	1431 (56.3)		
Talked about MOB preference to a HCP	141 (20.5)	411 (16.2)	4 (0.1)	0.007
Was referred from another hospital				
Labour and childbirth characteristics				
Labour onset				
Spontaneous	500 (72.8)	2232 (87.8)	3 (0.1)	<0.001
Analgesia or anaesthesia during first phase of labour	106 (15.4)	364 (14.3)	2 (0.0)	0.47
Gestational age (wk): mean (SD)	38.6 (1.7)	38.4 (1.7)	20 (0.6)	<0.001
Birth attendant				
Physician	623 (90.7)	1227 (48.3)	5 (0.1)	<0.001
Midwife/nurse/student	64 (9.3)	1314 (51.7)		
Mother's stay at hospital				
≥ 7 days	66 (9.6)	34 (1.3)	0 (0.0)	<0.001
< 7 days	621 (90.4)	2507 (98.7)		
Newborn Apgar score				
≥ 7	677 (98.5)	2524 (99.3)	9 (0.3)	0.05
< 7	10 (1.5)	17 (0.7)		
Birthweight (grams)				
≥ 2500	595 (86.6)	2228 (87.7)	0 (0.0)	0.45
< 2500	92 (13.4)	313 (12.3)		
Organizational factors at the hospitals where the women gave birth				
Distance from home ≥ 30 min	327 (47.6)	1115 (43.9)	37 (1.2)	0.08
Primary – secondary facility level	257 (37.4)	1424 (56.0)	0 (0.0)	0.002
Teaching hospital	506 (73.7)	1729 (68.0)	0 (0.0)	0.005
Volume of births in 2020 (median [IQR])	5670.0 [7702.8]	5250.2 [7021.0]	0 (0.0)	0.32
Public hospital	638 (92.9)	2345 (92.3)	0 (0.0)	0.61

[1] Number of missing values before mode imputation.
[2] Pearson's chi-square, Kruskal Wallis.
[3] Lower wealth index: 1st and 2nd quintiles, higher wealth index: 3rd, 4th and 5th quintiles.
[4] ANC: antenatal care visit.

preferred–initiated MOB definition (Table 5). The adjusted mean differences were small in absolute terms (≈0.03–0.05 on a 0–1 scale), and correspond to approximately a 3–5-percentage spoint differences. Nonetheless, the associations consistently favoured women with a match between their preference and the initiated or actual MOB. Effects were most pronounced for emotional satisfaction (0.04–0.05, with more precise 95% CIs excluding zero), whereas differences in communication were smaller and estimated with greater uncertainty (Table 4).

The association between matches and overall BES scores did not differ significantly between women who preferred VB and those who preferred CS (interaction test, p = 0.29 and p = 0.35, for preferred–initiated MOB and preferred–actual MOB matches, respectively).

The exploratory subgroup analysis excluded women who preferred CS in late pregnancy. It showed that a preferred–actual MOB match remained significantly associated with higher overall and dimension-specific scores, particularly for emotional satisfaction and support & respect by providers, with effect sizes similar to those observed in the full sample. In contrast, estimates for preferred–initiated MOB matches were small and not statistically significant (Supplementary Table S19).

The results of models re-estimation by treating "don't know" responses as missing values were materially unchanged (Supplementary Table S20), indicating that the main findings are robust to different treatments of "don't know" responses.

Similarly, in sensitivity analyses using complete-case analysis, observations with missing data on any model variable were excluded. Results were consistent with the primary analyses: overall BES scores were similar, emotional satisfaction and communication with providers showed the same directional patterns, and support and respect by providers demonstrated the same trend, with statistically significant associations under complete-case analysis (Supplementary Table S20).

Full covariate forest plots are presented in Supplementary files Figs. S5 and S6.

Discussion

Our study found that most women expressed a late-pregnancy MOB preference, with VB being strongly preferred across the four countries. Preferred–initiated and preferred–actual MOB match rates were high among women who preferred VB, whereas mismatches were more frequent among those who preferred CS. MOB preference matches were associated with higher BES scores, with associations stronger and more consistent for preferred–actual MOB matches than for

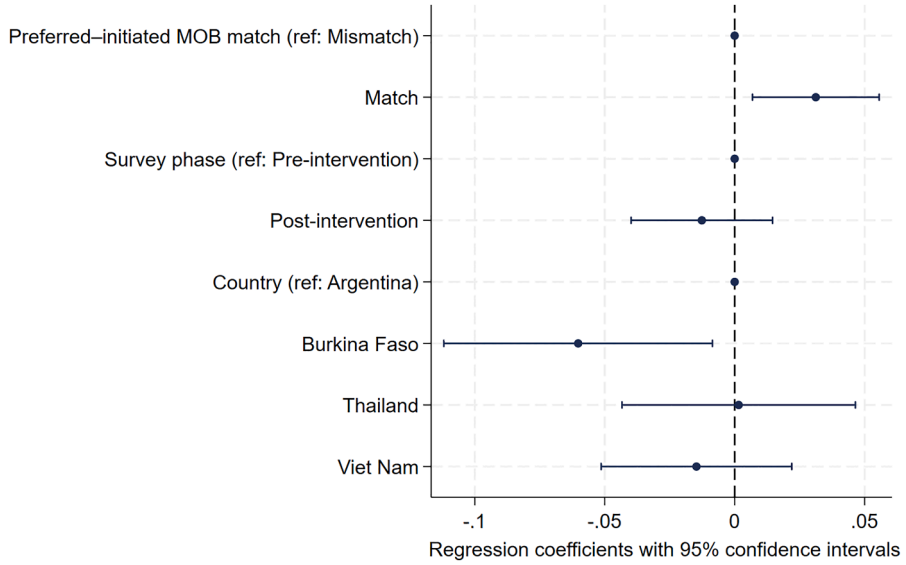


Fig. 2a. Model for the association between preferred–initiated MOB match and overall BES score (key coefficients).

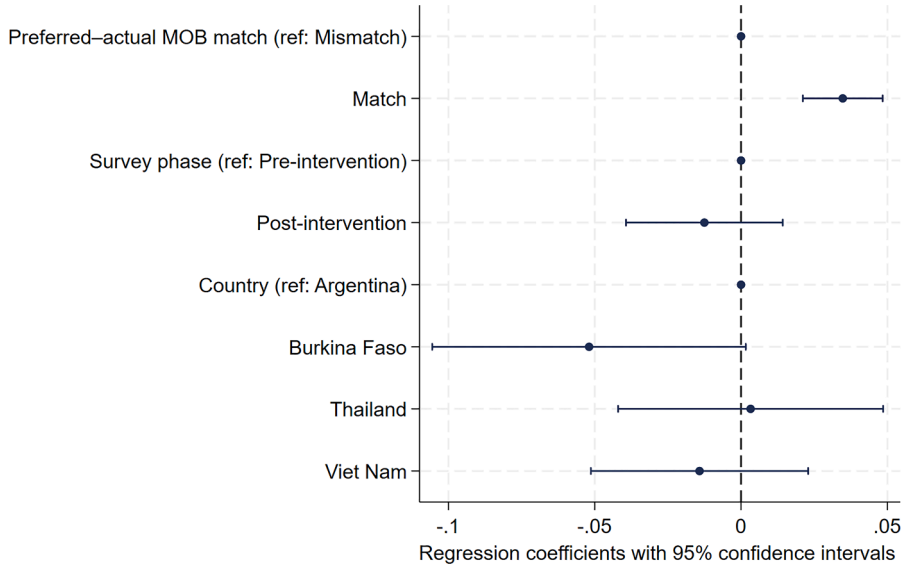


Fig. 2b. Model for the association between preferred–actual MOB match and overall BES score (key coefficients).

preferred–initiated MOB matches. The sensitivity analysis restricted to women who preferred VB showed a similar pattern for preferred–actual MOB matches, supporting the consistency of this finding and suggesting that the clearest associations emerge with preference actual matches. However, the observed mean differences were modest, ranging from 0.03 to 0.05 across BES scores, indicating statistically significant but small differences in absolute terms.

Our findings are consistent with previous studies conducted in different settings, which have shown that most women prefer VB (Coates et al., 2020; Etcheverry et al., 2024; Colomar et al., 2021). Notably, women in Argentina, Burkina Faso, Thailand and Viet Nam continue to prefer VB, despite contexts characterised by high rates of CS, physician-led maternity services, and limited availability of pain management strategies for those women concerned about labour pain (Etcheverry et al., 2024; Ouattara et al., 2021; Takegata et al., 2020; Nuampa et al., 2023; Perrotta et al., 2022). Etcheverry et al. nevertheless identified fear of labour as a major driver of CS preference among women in the four participating countries (Etcheverry et al., 2024). Taken together, these findings suggest that VB remains the predominant preference in these settings, despite contextual factors that may contribute to CS preference, with fear of labour potentially accounting for some of the observed CS preferences.

The high rates of preferred–initiated and preferred–actual MOB matches among women preferring VB contrast with the broader obstetric landscape of the four countries, where rising CS rates have raised concerns about potentially unnecessary CS and mismatches between women's preferred and documented MOB. Several factors may explain this apparent discrepancy. First, our sample comprised low-risk women, most of whom gave birth in public facilities, and may therefore not represent the populations or settings contributing most to CS overuse, such as women giving birth in private-sector facilities or those with higher socioeconomic status. This is consistent with evidence showing that system-level factors strongly influence CS use in LMICs (Bubpawong et al., 2025). Second, preferences were reported retrospectively in the early postpartum period, potentially introducing recall bias and reverse causation, as women's recollection of their preferences may have been

Table 5
Mean differences in BES scores by preferred–initiated and preferred–actual MOB match status.

	Match status	Mean BES scores (SD)	*N*	*p*-value[1]	Mean difference Adjusted β [95% CI] [2]	*p*-value	*N*[3]
Preferred–initiated MOB match							
Overall score	Mismatch	.85 (.12)	235	0.12	Ref	0.01	235
	Match	.86 (.11)	2993		.03 [.007; .06]		2993
Emotional satisfaction	Mismatch	.82 (.16)	231	0.002	Ref	0.001	231
	Match	.85 (.14)	2980		.04 [.02; .07]		2980
Support & respect by providers	Mismatch	.87 (.13)	235	0.03	Ref	0.004	235
	Match	.90 (.11)	2993		.03 [.01; .05]		2993
Communication with providers	Mismatch	.83 (.15)	235	0.50	Ref	0.13	235
	Match	.82 (.16)	2993		.02 [−.006; .05]		2993
Preferred–actual MOB match							
Overall score	Mismatch	.84 (.11)	687	<0.001	Ref	<0.001	687
	Match	.86 (.11)	2541		.03 [.02; .05]		2541
Emotional satisfaction	Mismatch	.81 (.17)	675	<0.001	Ref	<0.001	675
	Match	.86 (.14)	2536		.05 [.04; .07]		2536
Support & respect by providers	Mismatch	.89 (.12)	687	0.15	Ref	<0.001	687
	Match	.90 (.11)	2541		.03 [.01; .04]		2541
Communication with providers	Mismatch	.81 (.17)	687	0.80	Ref	0.006	687
	Match	.82 (.16)	2541		.03 [.007; 04]		2541

MOB: mode of birth (vaginal or caesarean birth).
[1] Wilcoxon rank-sum test.
[2] β is the regression coefficient, from the Heckman model adjusted for selection bias (Heckman), country, survey phase and confounding factors (see the models in Tables S15, S16 and S17 in supplementary material). Standard errors were clustered at the facility level.
[3] Missing data for emotional support score: $N = 4$ (1,7%) for women with mismatches and $N = 13$ (0.4%) for women with matches. The analytic *N* differs for the emotional satisfaction score because missingness on BES1 through BES3 does not fully overlap with missingness on the other BES items. The overall, support and respect by providers, and communication with providers scores exclude the same observations due to shared missing items, whereas an additional 17 women had missing values specifically for BES1–BES3, resulting in a smaller analytic sample for the emotional satisfaction score (Supplementary Figure S1).

influenced by their actual birth experience (Nuampa et al., 2023). Third, residual confounding remains possible; unmeasured factors such as communication, counselling, expectations, previous birth experiences, provider attitudes and the quality of interpersonal care may influence both MOB matches and BES scores, potentially contributing to the observed associations.

Our findings also suggest that some CS among women who preferred VB and had a preferred–actual MOB mismatch may not have been associated with clear medical indications. In particular, recorded indications such as suspected cephalopelvic disproportion, suspected macrosomia, dystocia, or foetal distress, maternal request may involve substantial clinical uncertainty, especially in LMICs where diagnosis criteria and decision-making processes may vary. Future studies using clinical audits and feedback approaches could help assess the appropriateness of recorded CS indications and identify opportunities to reduce potentially avoidable caesarean births while ensuring maternal and neonatal safety (Witsawapaisan et al.).

In contrast to VB preference, preferred–initiated and preferred–actual MOB match rates were lower among women who preferred CS (33.2% and 57.0%, respectively). Most women who preferred CS were from Thailand, where CS preference and demand have previously been associated with perceptions of greater control over the birth process, avoidance of labour pain, and reduced uncertainty about outcomes (Nuampa et al., 2023). Healthcare providers may also promote CS as a safer and more predictable option than VB, which is perceived as requiring greater clinical expertise (Nuampa et al., 2023). Almost half of the women who preferred CS in our study were in the lower wealth categories. Given that CS on maternal request is not covered under Thailand's Universal Coverage scheme, HCPs in QUALI-DEC public hospitals may have been less able or inclined to accommodate such preferences. More broadly, the low match rates may reflect differences between women's preferences and clinical decision-making, consistent with evidence that rising CS rates in the four countries are unlikely to be primarily driven by maternal request, as only 15% of maternal requests were accommodated (Etcheverry et al., 2024; Etcheverry et al., 2025). Although the sensitivity analysis showed that a preferred–actual MOB match remained associated with higher BES scores among women who preferred VB, women preferring CS represented a minority whose preferences may be more difficult to accommodate in the absence of a medical indication. Given that fear of childbirth is a major driver of CS preference across the four LMICs (Etcheverry et al., 2024), appropriate counselling and support should address the perceived benefits and risks of both modes of birth. Where CS is requested without a medical indication, decisions should balance women's preferences with the potential maternal and neonatal risks and the capacity to manage these risks safely (Etcheverry et al., 2024; The American College of Obstetricians and Gynecologists (ACOG) 2025).

Our findings on the association between preferred–actual matches and BES in LMICs are consistent with results from high-income countries (Webb et al., 2021). They echo Gustafsson and Raudasoja's qualitative findings, which highlighted that meeting women's expectations regarding MOB is central to ensuring a positive birth experience (Gustafsson and Raudasoja, 2025). To our knowledge, our study is among the first to quantify this association in LMICs, addressing a gap in the literature, as most previous research have focused on high-income settings and have examined birth satisfaction in relation to other factors such as continuity of care, breastfeeding, postnatal follow-up, companionship, or freedom in birthing positions (Webb et al., 2021; Larsson et al., 2022). Women in our study also reported higher emotional satisfaction and support & respect by providers scores when their preferences were fulfilled. Although this finding may not directly reflect healthcare providers' objective level of support, it suggests that correspondence between women's preferred and actual MOB may be relevant to their perceptions of emotional support and the woman–provider relationship during childbirth. As the BES is grounded in women's perceptions, higher scores may capture the overall quality of the care context rather than the active accommodation of the women's preferences per se.

Nonetheless, the absolute mean differences were small, although statistically significant. On the one hand, this is expected given the bounded 0–1 scale and the high satisfaction levels observed. Within this constrained range, the observed 0.03–0.05 increases – approximating 0.3–0.5 SD, a commonly used threshold for clinical relevance – represents a modest but significant shift in women's reported experiences

(Schünemann et al., 2006; Crosby et al., 2003). However, these modest increases consistently favoured women whose preferences were fulfilled. On the other hand, although the consistency of the estimates across models suggests a potentially relevant pattern, the QD-BES does not yet have an established minimal clinically important difference (MCID). Thus, there remains uncertainty on the clinical meaningfulness of this magnitude. Future research should establish an MCID for the QD-BES to clarify what magnitude of difference in scores is clinically important and to better inform the interpretation of associations between MOB matching and women's BES (Schünemann et al., 2006).

Given the inherent unpredictability of childbirth, a match between women's preferred and actual MOB cannot always be achieved. Services may consider providing additional emotional support to women whose documented MOB does not match their preference.

Study limits and strengths

Limits

The interpretation of our findings must consider four methodological limitations.

First, mean BES scores were relatively high (> .80) across countries, possibly reflecting early postpartum timing of survey administration. Conducting interviews before hospital discharge may also have introduced courtesy or social desirability bias, potentially inflating BES scores. Follow-up assessments conducted several weeks after birth might yield lower scores, particularly for items assessing professional support (Lyngbye et al., 2022).

The high overall BES scores also suggest possible ceiling effects, which may reduce the sensitivity of the scale to detect differences and could bias associations toward the null. Repeated administration of the QD-BES at different time points would help assess the robustness of these findings and the temporal stability of BES scores (Bohren et al., 2025).

Second, BES scores were derived from a 7- to 10-item questionnaire, depending on item applicability to individual women. This variation in the number of applicable items may particularly affect the computation of the emotional satisfaction dimension. We therefore used ratio-based scores rather than raw scores to standardise values across contexts and hospital policies. Although this approach facilitates comparability, item-specific missingness may introduce measurement uncertainty, particularly when the characteristics of missing items differ from those of observed items (Mazza et al., 2015). Context- and clinically sensitive versions of the QD-BES may therefore need to be developed and validated. In addition, coding "don't know" responses as 2.5, the midpoint of the scale, may mask meaningful differences between true ambivalence, lack of recall, and lack of exposure to a specific aspect of care. These responses may therefore not fully capture the underlying uncertainty or ambivalence and should be interpreted with caution.

Third, although the proportion of missing data was low and is unlikely to have substantially affected the estimates, our approach to missing data, including complete-case analysis and mode imputation, relies on assumptions about the underlying missingness mechanism (Hunt et al., 2021; Eekhout et al., 2012). If these assumptions are not fully met, some degree of bias or reduced precision cannot be ruled out (Hunt et al., 2021; Sterne et al., 2009). We therefore acknowledge that some residual bias or loss of precision cannot be entirely excluded.

Fourth, limitations also pertain to the construction of the exposure variable. We did not distinguish spontaneous from instrumental VB in the actual MOB classification, limiting our ability to capture potential differences in birth experiences associated with instrumental VB. However, grouping them as VB was consistent with previous literature examining MOB preferences and birth experiences, which typically analyses MOB preferences using broad VB versus CS categories (Fobelets et al., 2019; Larsson et al., 2022; Sluijs et al., 2020; Coates et al., 2020). This categorisation is particularly relevant in settings with high CS rates. Moreover, the small number of instrumental births in our sample limited the feasibility of a more granular analysis.

Our findings should also be interpreted in light of our operational definition of initiated MOB. Initiated MOB was based on the obstetric management strategy documented on or before the onset of labour, classified as trial of labour or prelabour CS. This definition does not capture detailed birth plans, preferences regarding specific intrapartum interventions, or changes in preferences during pregnancy or labour. Importantly, a preferred–initiated MOB match indicates correspondence between the woman's stated MOB preference and the documented MOB initiated on or before labour onset; it does not indicate that the preference was actively discussed, negotiated, or accommodated by HCPs. Our findings should therefore not be interpreted as directly measuring birth plan accommodation or the quality of shared decision-making around MOB. As such, our findings may not be generalisable to other conceptualisations of birth planning or birth plan accommodation.

Regarding confounders, we were unable to measure or operationalise several contextual factors - such as staffing levels, availability of analgesia, companionship during labour, intrapartum clinical indications, and provider attitudes - that may influence both matches and BES. These unmeasured aspects of care quality could lead to residual confounding, and their likely direction would generally bias associations upward.

The cross-sectional design limits causal inference. Although we adjusted for a range of sociodemographic and obstetric characteristics, residual confounding remains possible. Unmeasured aspects of care quality – particularly the quality of communication or interpersonal support – may simultaneously increase the likelihood of matches and lead to higher BES scores, thereby contributing to the associations observed.

The study's external validity is limited by the non-population-based selection of participants and the exclusion of women with potential risk of CS. In addition, we only had two private hospitals based in Viet Nam (Table S1). As such, results may be generalised to private facilities in Viet Nam with similar contexts as those included in the study. But results may not be generalised to home births, or women with clinical indications for CS.

This study was restricted to women without clinical conditions that could indicate CS. Therefore, women whose clinical circumstances may have constrained their MOB options were not represented in the analysis. The perspectives of these women remain important, as medical necessity may intersect with personal preferences in ways that influence decision-making and satisfaction with care. Future research should include women with potential medical indications for CS to capture their experiences, expectations, and concerns. Such research could provide a more comprehensive understanding of the relationship between MOB preferences, documented MOB, and BES.

Finally, although the BES composite indicator and its WHO-aligned dimensions were appropriate for addressing our primary objective (Dumont et al., 2020; Bohren et al., 2025), using composite indicators inevitably reduces item-level nuance. Item-level analyses could provide additional granularity and insight into which specific aspects of emotional satisfaction, support & respect by providers and communication warrant targeted improvement. Such analyses were beyond the scope of the present study but represent a valuable direction for future work. We also acknowledge that the BES, while constructed from conceptually grounded items and supported by internal consistency, should be interpreted as an indicator of overall perceived experience rather than a fully validated diagnostic instrument.

Strengths

Despite these limitations, our study has several strengths that enhance the relevance and comparability of the findings. First, the multisite, multicountry design strengthens the relevance and transferability of the findings across diverse LMIC hospital settings. Data-collection procedures were standardised across all sites, including harmonised interviewer training, quality-control procedures, and questionnaires. This standardisation supports comparability across

settings and strengthens the applicability of the findings to hospitals with similar characteristics in LMICs.

Second, we used the QD-BES scale, which was specifically validated for the participating countries (Bohren et al., 2025). This provides a context-appropriate and psychometrically evaluated measure of women's BES, supporting comparability of BES across the four study settings. However, validation does not fully resolve outcome measurement challenges related to high scores and ceiling effects, the varying number of BES items, ratio-based scoring, and the handling of "don't know" responses.

Third, we assessed MOB matching using two complementary definitions: preferred–initiated MOB match and preferred–actual MOB match. The first captures correspondence between women's preferences and the documented MOB initiated on or before labour onset, whereas the second captures correspondence with the final MOB documented in medical records. Analyses using initiated MOB therefore served as a conceptual sensitivity analysis, recognising that key decisions are frequently made before labour onset. Examining both definitions allowed us to distinguish mismatches arising at the initiation of the birth pathway from those emerging during labour and birth.

Fourth, restricting the analysis to women without clinical conditions that could indicate CS reduced the potential for clinical indications to constrain MOB options, providing a more clinically comparable population for examining associations between MOB matching and BES, although it also introduces substantial selection and limits generalisability.

Importantly, this study addresses a gap in the literature by providing multicountry evidence from LMICs on the association between MOB matching and BES, using the same validated instrument and harmonised data-collection protocols across four countries, whereas most existing evidence comes from high-income settings.

Conclusion

The findings of this study suggest that preferred–actual MOB matches are modestly but consistently associated with higher BES scores. This association, previously reported mainly in high-income settings, was also observed in the four LMICs included in this study. Alignment between women's MOB preferences and documented MOB may therefore be relevant to understanding women's birth experiences and satisfaction with care. Additional research is needed to clarify how and why this alignment is associated with these outcomes in LMICs.

Funding

This study is part of the QUALI-DEC project which is co-funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No. 847567 and by UNDP-UNFPA-UNICEF-WHO-World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP), a cosponsored programme executed by the World Health Organization (WHO) in the Department of Sexual and Reproductive Health and Research (SRH). Alexandre Dumont was awarded the Horizon Birth Day Prize from the European Commission in 2018, which contributed to the development of this project. The funders had no involvement in the study design, data collection, analysis, interpretation of data, writing the article, or the decision to submit for publication. The contents of this article are solely the responsibility of the authors and do not reflect the views of the EU, UNDP, UNFPA, UNICEF, WHO, or the World Bank or their respective institutions.

Ethics declaration

Written informed consent to take part in the study and to publish the article has been obtained from all participants or their legal representatives. The privacy rights of participants have been observed.

This study was performed in compliance with relevant laws, regulatory frameworks and guidelines where the research took place. This study was approved by the Centro Rosarino de Estudios Perinatales of Rosario, Argentina (Record Notice No. 1/20), Pham Ngoc Thach University of Ho Chi Minh City in Viet Nam, Khon Kaen University in Thailand, the Ethics Committee for Health Research of Burkina Faso (Decision No. 2020-3-038), the Research Project Review Panel (RP2) in the UNDP/UNFPA/UNICEF/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction (WHO study No. A66006), and the French Research Institute for Sustainable Development (IRD). (Approval No. Record Notice No. 1/20; Decision No. 2020-3-038; WHO study No. A66006. This study is on the Current Controlled Trials website (https://www.isrctn.com/) under the number ISRCTN67214403.)

CRediT authorship contribution statement

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We thank all the data collectors, scientific and administrative staff of the participating institutions for their valuable contribution to this study. The QUALI-DEC research group is a consortium of researchers and implementers of nine institutions across Europe, Argentina, Burkina Faso, Thailand, and Vietnam. This group developed the QUALI-DEC project and is responsible for the implementation and the evaluation of the multifaceted intervention. The composition of the group is as follows: Karolinska Institutet (Sweden): Claudia Hanson, Helle Molsted-Alvesson, Kristi Sidney Annerstedt, Karen Zamboni, Amanda Cleeve, Emma Wallengren; University College Dublin, National University of Ireland (Ireland): Michael Robson; World Health Organization (Switzerland): Ana Pilar Betràn, Newton Opiyo, Meghan A. Bohren; Centro Rosario de Estudios Perinatales (Argentina): Guillermo Carroli, Liana Campodonico, Celina Gialdini, Berenise Carroli, Gabriela Garcia Camacho, Daniel Giordano, Hugo Gamerro, Gino Bartolelli, Mercedes Vila Ortiz; CEDES (Argentina): Mariana Romero; Khon Kaen University (Thailand): Pisake Lumbiganon, Dittakarn Boriboonhirunsarn, Nampet Jampathong, Kiattisak Kongwattanakul, Ameporn Ratinthorn; Somporn Rungreangkulkij, Paradee Tungtang; Fundacio Blanquerna (Spain): Ramon Escuriet, Olga Canet; Centre national de recherche scientifique et technologique - Institut de Recherche en sciences de la sante (Burkina

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We would also like to thank Andy Andrainolo Ravalihasy, Statistical Engineer at Ceped, 45 rue des Saints-Pères, F-75006 Paris, France, for his assistance with the statistical aspects of this study.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.midw.2026.104991.

Data availability

The datasets used and/or analysed during the current study will be available from the completion of the QUALI-DEC trial in July 2025 via the QUALIDEC study Zenodo platform: https://zenodo.org/communities/qualidec/records?q=&l=list&p=1&s=10&sort=newest. Requests regarding data use should be directed to the communications officer for the project, Ouarda Lunetta-Namane (qualidecproject@gmail.com).

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